

What is claimed is:

1. A method of mixing a caustic substance with a liquid, the method comprising:

5 providing a primary container having the caustic substance, the primary container having a bottom and a top, the caustic substance filling the primary container from the bottom to a given point between the bottom and top, the primary container having an outlet between the given point and the top of the primary container;

10 adding a predetermined amount of the liquid to the primary container to produce a combined caustic substance and liquid, the combined caustic substance and liquid rising to the outlet after the liquid is added; and

permitting at least a portion of the combined caustic substance and liquid to flow from the primary container through the outlet after the
15 combined caustic substance and liquid rises to the outlet.

2. The method as defined by claim 1 further comprising coupling the outlet to a final container, the portion of the combined caustic substance and liquid flowing from the primary container to the final container via the outlet.

20

3. The method as defined by claim 2 further comprising disconnecting the final container from the primary container, the liquid remaining in the final container having a concentration of caustic substance that is a function of the amount of liquid added to the primary container, the concentration being
25 sufficient for blood processing.

4. The method as defined by claim 1 wherein after the liquid is added to the container, the concentration of caustic substance varies within the primary container.

30

5. The method as defined by claim 1 wherein the liquid is a diluting solution.
6. The method as defined by claim 5 wherein the liquid is a buffer solution.
7. The method as defined by claim 1 wherein the orientation of the primary container remains stable as the liquid is added to the primary container.
8. The method as defined by claim 1 wherein the primary container has a septum to sealingly contain the caustic substance.
9. The method as defined by claim 8 wherein the primary container has a top surface that is formed by the septum, providing including coupling a tube through the septum to produce the outlet.
10. The method as defined by claim 8 wherein providing comprises piercing a spike assembly through the septum in the primary container, the spike assembly having at least one spike forming an inlet for receiving the liquid and an outlet.
11. The method as defined by claim 1 wherein the primary container includes an inlet, further wherein adding includes adding the liquid to the primary container through the inlet.
12. The method as defined by claim 1 wherein the caustic substance has a pH that is greater than about 11.0.
13. The method as defined by claim 1 wherein the combined caustic substance and liquid rise to the outlet while the liquid is being added.

14. The method as defined by claim 1 wherein the primary container is produced from materials capable of withstanding substantially immediate corrosion by the caustic substance.

5

15. The method as defined by claim 1 wherein the caustic substance is an anti-pathogen compound.

16. A system for mixing a caustic substance with a liquid, the system
10 comprising:
a primary container for containing the caustic substance, the primary container having a bottom and a top, the caustic substance filling the primary container from the bottom to a given point between the bottom and top, the primary container having an outlet between the given point and the top of the
15 primary container;
a liquid controller operatively coupled with the primary container, the liquid controller being capable of adding a predetermined amount of the liquid to the primary container to produce a combined caustic substance and liquid, the liquid controller being capable of causing the combined caustic
20 substance and liquid to rise to the outlet after the liquid is added,
at least a portion of the combined caustic substance and liquid flowing from the primary container through the outlet after the combined caustic substance and liquid rises to the outlet.

25 17. The system as defined by claim 16 further comprising a final container capable of coupling with the outlet, the portion of the combined caustic substance and liquid being capable of flowing from the primary container to the final container via the outlet when the final container is coupled with the outlet.

30

18. The system as defined by claim 16 wherein the liquid is a diluting solution.

19. The system as defined by claim 16 wherein the primary container has a septum to sealingly contain the caustic substance.

20. The system as defined by claim 19 wherein the primary container has a top surface that is formed by the septum, the system further including a tube coupled through the septum to produce the outlet.

21. The system as defined by claim 19 further including a spike assembly capable of piercing through the septum in the primary container, the spike assembly having at least one spike forming an inlet for receiving the liquid and an outlet after piercing the septum.

22. The system as defined by claim 16 wherein the primary container includes an inlet for receiving the liquid.

23. The system as defined by claim 16 wherein the caustic substance has a pH that is greater than about 11.0.

24. The system as defined by claim 16 wherein the primary container is produced from materials capable of withstanding substantially immediate significant corrosion by the caustic substance.

25. The system as defined by claim 16 wherein the caustic substance is an anti-pathogen compound.

26. An apparatus for mixing a substance with a liquid, the substance being contained in a container assembly having a sealed container that contains the substance, the container assembly also having a port assembly to permit

substance to flow from the sealed container when coupled, the apparatus comprising:

- a receiving chamber for receiving the container assembly;
- a container assembly controller operatively coupled with the receiving
5 chamber, the container assembly controller controlling coupling of the
container and the port assembly; and
- a liquid controller operatively coupled with the receiving chamber, the
liquid controller controlling the flow of the liquid into the container to
produce a combined substance and liquid.

10

27. The apparatus as defined by claim 26 wherein the liquid controller controls flow of the liquid to also control the flow of combined substance and liquid from the container.

- 15 28. The apparatus as defined by claim 26 wherein the container assembly controller mechanically moves at least a portion of the container assembly to couple the container with the port assembly.

- 29. The apparatus as defined by claim 26 wherein the container assembly
20 controller includes logic for detecting the relative locations of the container and the port assembly.

- 30. The apparatus as defined by claim 26 wherein the receiving chamber
has a cover capable of being in either one of an open position and a closed
25 position, the cover securing the container assembly within the receiving
chamber when in the closed position, the container assembly controller
having logic for detecting if the cover is in the closed position.

- 31. The apparatus as defined by claim 30 wherein the container assembly
30 controller permits the container to couple with the port assembly after
detecting that the cover is in the closed position.

32. The apparatus as defined by claim 30 further including a cover lock that prevents the cover from being moved from the closed position while the liquid is being received by the container.

5

33. The apparatus as defined by claim 26 further including a pneumatically controlled member within the receiving chamber, the pneumatically controlled member capable of contributing to the coupling of the container assembly in response to commands from the container assembly controller.

10

34. The apparatus as defined by claim 26 wherein the liquid controller includes logic that stores a value representing a predetermined amount of liquid to be received by the container assembly.

15

35. The apparatus as defined by claim 26 further comprising a housing containing at least one of the container assembly controller and the liquid controller.

20 36. The apparatus as defined by claim 26 wherein the receiving chamber at least partially extends outwardly from the housing.

37. The apparatus as defined by claim 26 further comprising a sensor within the receiving chamber for detecting the location of the container within the receiving chamber.

25

38. The apparatus as defined by claim 26 wherein the receiving chamber is configured to contain the container assembly in a single orientation.

39. The apparatus as defined by claim 26 further comprising a set of valves controlled by the liquid controller to control the flow of liquid into the container.
- 5 40. The apparatus as defined by claim 26 further comprising a cassette used by the liquid controller to measure the volume of the liquid to be directed to the container.
41. The apparatus as defined by claim 26 wherein the substance is a caustic
10 solution.
42. The apparatus as defined by claim 26 wherein the substance is an anti-pathogen compound.
- 15 43. The apparatus as defined by claim 26, wherein the container assembly includes a container receptacle for holding the container and locking with the port assembly.
44. The apparatus as defined by claim 43, wherein the container receptacle
20 includes a first locking feature that interfaces with a corresponding second locking feature of the port assembly.
45. The apparatus as defined by claim 44, wherein the first locking feature comprises a plurality of port assembly engagement teeth, and wherein the
25 port assembly comprises a corresponding locking feature that engages the plurality of port assembly engagement teeth.
46. The apparatus as defined by claim 45, wherein the container receptacle includes a plurality of tabs, each tab having port assembly engagement teeth,
30 wherein the port assembly engagement teeth on adjacent tabs are staggered relative to one another.

47. The apparatus as defined by claim 46, wherein the port assembly engagement teeth are staggered by approximately half the height of a tooth.
- 5 48. The apparatus defined by claim 43, wherein the container receptacle comprises at least one raised switch engagement feature on an outer surface of the container receptacle for operating a sensor within the receiving chamber.
- 10 49. An apparatus for mixing a substance with a liquid, the substance being contained in a container assembly having a sealed container that contains the substance, the container assembly also having a port assembly to permit substance to flow from the sealed container when coupled, the apparatus comprising:
- 15 means for receiving the container assembly;
 coupling means for controlling coupling of the container and the port assembly; and
 flow means for controlling the flow of the liquid into the container to produce a combined substance and liquid.
- 20 50. The apparatus as defined by claim 49 wherein the flow means controls flow of the liquid to also control the flow of combined substance and liquid from the container.
- 25 51. The apparatus as defined by claim 49 wherein the coupling means includes means for mechanically moving at least a portion of the container assembly to couple the container with the port assembly.
52. The apparatus as defined by claim 49 wherein the coupling means
30 includes means for detecting the relative locations of the container and the port assembly.

53. The apparatus as defined by claim 49 wherein the receiving means has a cover capable of being in either one of an open position and a closed position, the cover securing the container assembly within the receiving
5 means when in the closed position, the coupling means having means for detecting if the cover is in the closed position.

54. The apparatus as defined by claim 53 wherein the coupling means permits the container to couple with the port assembly after detecting that the
10 cover is in the closed position.

55. The apparatus as defined by claim 53 further including a cover lock that prevents the cover from being moved from the closed position while the liquid is being received by the container.

15

56. The apparatus as defined by claim 49 further including a pneumatically controlled means within the receiving means, the pneumatically controlled means capable of contributing to the coupling of the container assembly in response to commands from the coupling means.

20

57. The apparatus as defined by claim 49 wherein the flow means includes means for storing a value representing a predetermined amount of liquid to be received by the container assembly.

25 58. The apparatus as defined by claim 49 further comprising a housing containing at least one of the coupling means and the flow means.

59. The apparatus as defined by claim 49 wherein the receiving means at least partially extends outwardly from the housing.

30

60. The apparatus as defined by claim 49 further comprising a means for detecting the location of the container within the receiving means.

5 61. The apparatus as defined by claim 49 wherein the receiving means is configured to contain the container assembly in a single orientation.

62. The apparatus as defined by claim 49 further comprising a set of valves controlled by the flow means to control the flow of liquid into the container.

10 63. The apparatus as defined by claim 49 further comprising a means for measuring the volume of the liquid to be directed to the container, the measuring means being used by the flow means.

15 64. The apparatus as defined by claim 49 wherein the substance is a caustic substance.

65. The apparatus as defined by claim 49 wherein the substance is an anti-pathogen compound.